

REMARKS

Previously, claims 1-27 were pending in this application. Claims 1-2, 6, 9-10, 13, 19, 22-23, and 25-27 are amended herein, and new claims 28-31 are being added. After entry of this Amendment, claims 1-31 will be pending. Applicant believes that no new matter is introduced by this amendment.

The Office Action dated 27 March 2003 rejected claims 1-5, 10-11, 13-15, 17-18, 23-24, and 27 under 35 U.S.C. §102(a) as being anticipated by U.S. Patent No. 6,512,751 to Struhsaker *et al.* (the '751 patent). The Office Action also rejected claims 9, 12, 16, 22, and 25-26 under 35 U.S.C. §103(a) as being unpatentable over the same '751 patent. Finally, the Office Action objected to claims 6-8 and 19-21 as being dependent upon a rejected base claim. Claims 1-2, 6, 9-10, 13, 19, 22-23, and 25-27 have been amended herein to expedite prosecution of the present application.

The present invention provides for improved transmission of streaming data signals, such as audio or video signals, in a wireless network. Each of the data signals corresponds to a particular symbol and is indicative of a particular streaming data signal, such as an audio or video signal. The symbols are generally arranged in a series of frames suitable for wireless transmission. Prior to transmission, the symbols are interleaved to produce interleaved frames. More specifically, the symbols in one of the frames are interleaved with symbols of an adjacent frame. Thus, the present invention relates to symbol interleaving across multiple frames. In this manner, the consequences of a lost or corrupted frame, such as a "blip" or a "pop" in an audiovisual signal, are reduced.

Rejection of Claims 1-5, 10-11, 13-15, 17-18, 23-24, and 27 under 35 U.S.C. §102(a)

Claims 1-5, 10-11, 13-15, 17-18, 23-24, and 27 stand rejected under 35 U.S.C. §102(a) as being anticipated by the '751 patent.

The Examiner states that the '751 patent "appears to teach a method for transmitting A/V data signals in a wireless network" and that "each protocol identified . . . is transmit using symbols that represent one or more bits." The Examiner was further of the opinion that the '751 patent, "appears to teach interleaving symbols between frames including but not limited to adjacent frames."

The ‘751 patent indeed describes applying a Forward Error Correction (FEC) algorithm to a burst frame used in implementing a Local Area Network (LAN) over a Wireless Local Loop (WLL). Namely, FEC encoding is applied to specific fields/bits within a burst frame. [See column 13, line 26.] An exemplary frame structure is described as including multiple groups of FEC-protected bits (*e.g.*, three groups of 24 bits using a (24,12) Golay FEC for a total of 72 bits). [*Id.*, lines 40-44.] Thus, the frame structure of the ‘751 patent includes a number of bits grouped into multiple FEC blocks. The ‘751 patent further describes interleaving the FEC encoded blocks to spread single burst errors across all three FEC blocks. [*Id.*, lines 44-46.] An exemplary (6,12) interleaver is described having 6 rows and 12 columns to accommodate the 72 bits of the three FEC blocks. [*Id.*, lines 65-67; see generally Figure 5.] Thus, as the three FEC blocks reside within the same burst frame, the ‘751 patent describes bit interleaving within the same frame.

The ‘751 patent thus fails to teach or disclose “interleaving the symbols in one of the frames with symbols in an adjacent one of frames in the series of frames” as claimed. Rather, the ‘751 patent only describes interleaving bits within the same frame. In order to reject a claim under 35 U.S.C. §102(a), the reference must teach each and every element of the claim. As stated by the Federal Circuit, “A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Accordingly, Applicant submits that amended claims 1, 13, and 27 are patentably distinguishable from the cited art and therefore not anticipated by it, because the reference does not teach each and every aspect of the claimed invention. Applicant respectfully requests that the Examiner reconsider and withdraw the §102(a) rejection of claims 1, 13, and 27.

Claims 2-5, 10-11, 14-15, 17-18, and 23-24 depend either directly or indirectly on amended base claims 1 and 13, and therefore contain all the elements of amended base claims 1 and 13. Therefore, each of these claims is allowable for the same reasons.

Rejection of Claims 9, 12, 16, 22, and 25-26 under 35 U.S.C. §103(a)

Claims 9, 12, 16, 22, and 25-26 stand rejected under 35 U.S.C. §103(a) as being unpatentable over the '751 patent. The Examiner states, among other things, that the '751 patent "appears to teach frame/block interleaving. Applicant respectfully traverses this rejection.

In order to reject a claim under 35 U.S.C. §103(a), the Office Action must first establish a *prima facie* case of obviousness. Establishing a *prima facie* case of obviousness requires that: (i) there must be some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference; (ii) there must be a reasonable expectation of success; and (iii) the prior art reference must teach or suggest all of the claim limitations. *In re Vaeck*, 947 F2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

The '751 patent provides no suggestion or motivation to modify the bit interleaving scheme applied to FEC encoded blocks. The '751 patent neither teaches nor suggests interleaving of symbols between frames. As argued above, the '751 patent only describes bit interleaving within the same frame. Further, in the '751 patent, interleaving is only described as being used in combination with FEC encoding to spread multi-bit errors across multiple code blocks. Spreading bit errors across multiple code blocks reduces the number of bit errors in any one code block and enhances operation of the FEC. By explaining that techniques that reduce the interleaving delay are advantageous [Col. 13, lines 48-60], the '751 patent suggests only that a reduced interleaving delay is desirable. Modification of the '751 patent interleaver structure to interleave symbols with adjacent frames, or any other frames, would actually increase interleaving delay. More specifically, the delays identified in Figure 4 would be multiplied by interleaving across multiple burst frames, because multiple burst frames would have to be transmitted and received before the bits of an adjacent frame would be available for de-interleaving and subsequent decoding. Thus, the '751 patent provides no suggestion or motivation to interleaving the symbols in one of the frames with symbols in an adjacent one of frames in the series of frames--in fact, it actually teaches away from Applicant's approach.

Additionally, there would be little or no expectation of success using symbol interleaving across multiple burst frames of the FEC-interleaving scheme described in the '751 patent. First, as suggested by the '751 patent, reduced delay is desirable. This is particularly true with respect to time-critical, streaming data signals, such as audiovisual signals. As argued above, the delays

described in the '751 patent would necessarily be multiplied using interleaving across multiple burst frames. Second, as the '751 patent suggests the importance of minimizing delays, it nowhere suggests that the FEC-interleaving scheme would even be possible considering the quantum delay increases introduced by multi-frame interleaving.

Moreover, adapting the single-frame, bit interleaving technique described in the '751 patent to perform symbol interleaving across multiple frames would require a substantial reconstruction and redesign as well as a change in the basic principle under which the single-frame, bit interleaving construction of the '751 patent was designed to operate. If the proposed modification of the prior art reference would change the principle of operation of the prior art invention being modified, then the teachings of the reference are not sufficient to render the claims *prima facie* obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Since the frame structure of the '751 patent would require a substantial redesign to include such a capability, the claimed invention would not be obvious to one of ordinary skill in the art.

Furthermore, the '751 patent fails to teach or suggest all of the claim limitations of claims 9, 12, 16, and 22. As but one example, each of these claims require interleaving symbols in one of the frames with symbols in an adjacent one of the frames in the series of frames. As argued above with respect to the §102(a) rejection, the '751 patent fails to teach or suggest at least this limitation.

Accordingly, Applicant respectfully requests that the Examiner reconsider and withdraw the §103(a) rejection of claims 9, 12, 16, 22, and 25-26.

Objection to Claims 6-8 and 19-21

Claims 6-8 and 19-21 were only objected to as being dependent upon a rejected base claim. The Examiner stated these claims would be allowable if amended to include the limitations of the base claim and any intervening claims.

Applicant herein amends claim 6 and 19 to include the limitations of the base claims and any intervening claims from which they previously depended. These claims are now allowable.

Claims 7-8 and 20-21 are also allowable, as they too depend either directly or indirectly from allowable base claims.

Patentability of New Claims 28-31

Support for new claims 28-31 can be found within the specification, at least at page 5, lines 18-20, and page 8, lines 3-6. Applicant respectfully submits that these claims are allowable for the same reasons as claim 1.

CONCLUSION

In view of the above amendments and remarks, it is believed that all claims are in condition for allowance, and it is respectfully requested that the application be passed to issue. If the Examiner feels that a telephone conference would expedite prosecution of this case, the Examiner is invited to call the undersigned.

Respectfully submitted,

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